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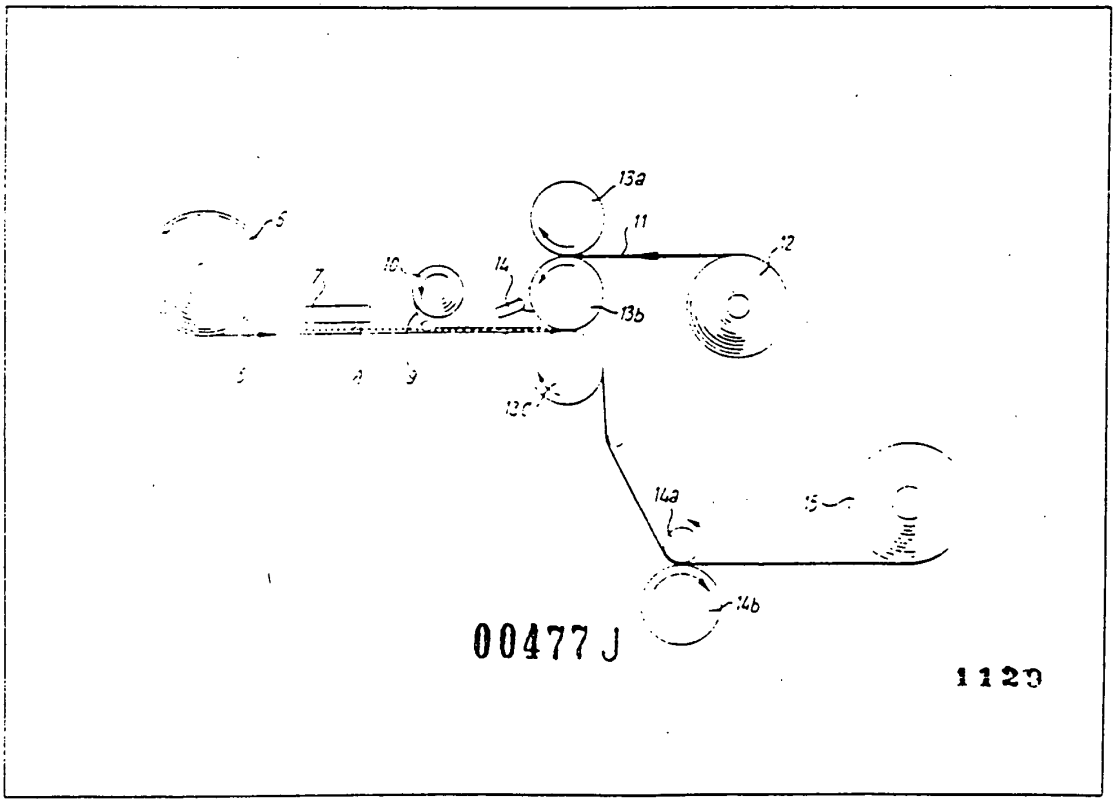
(54) **Laminating process**

(57) A process for the production of a laminated product comprises continuously feeding a flexible carrier sheet 5, distributing discrete particulate material 8 over the upper surface of the sheet, moving a sheet of flexible foamed plastics material 11 in synchronism with the carrier sheet, bringing the sheets into juxtaposition after application of said particulate material to the carrier sheet, and continuously adhering the sheets together by fusion. The particulate material may be selected from fabric softeners, insecticides, pesticides, fungicides, fertilizers, drying agents, weldable materials and air freshening compositions.



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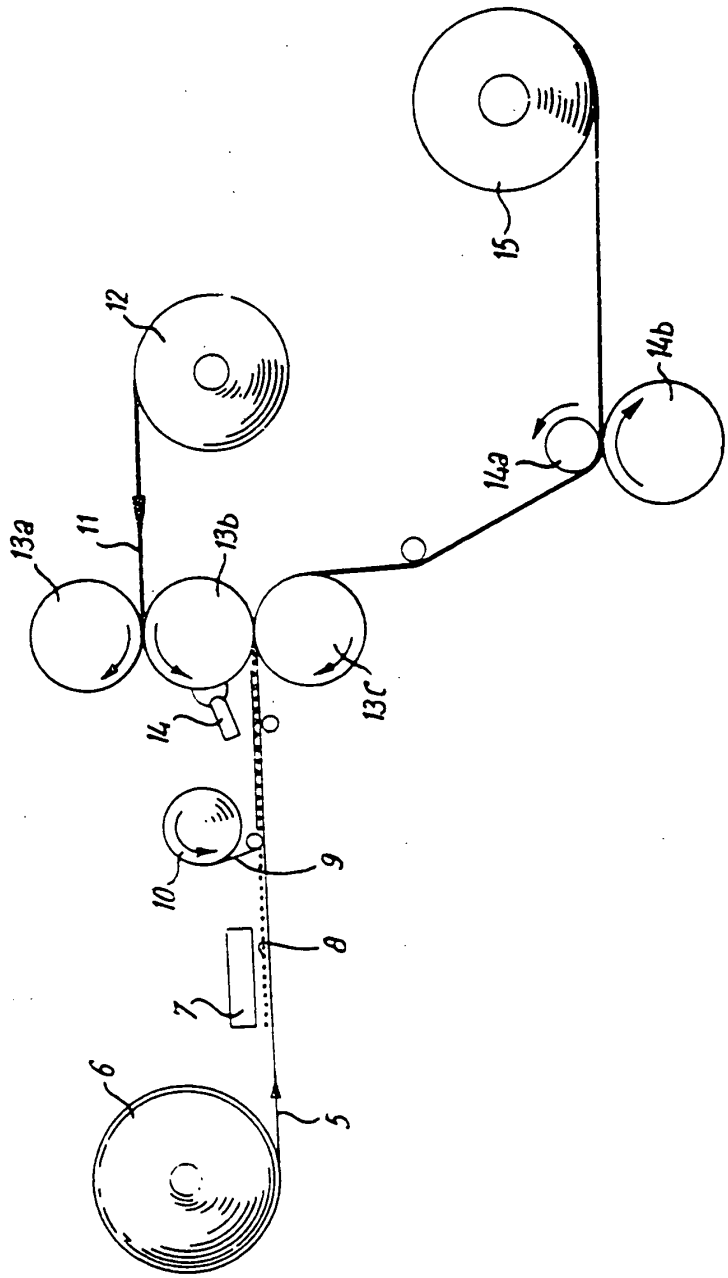

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SPECIFICATION

Production of laminated products

The invention relates to the production of laminated products.

It is an object of the invention to provide a laminated product incorporating discrete particulate material which is uniformly dispersed throughout the product and which may be rapidly produced using a continuous process.

According to one aspect of the invention there is provided a process for the production of a laminated product comprising continuously feeding a flexible carrier sheet, distributing discrete particulate material over the upper surface of the continuously moving sheet, moving a sheet of flexible foamed plastics material in synchronism with said carrier sheet, bringing said sheet of foamed plastics material into juxtaposition with the upper surface of said carrier sheet after application of said particulate material thereto, and continuously adhering the sheets together by fusion.

Preferably said sheets are fused together by flame lamination. In order to avoid damage to the particular material the flame is preferably brought into contact with the surface of said foam plastics sheet before the latter is brought into juxtaposition with the carrier sheet.

The carrier sheet may comprise a non-woven fibrous material but preferably comprises a sheet of foamed plastics material. The foamed plastics material constituting the upper sheet and, where appropriate, the carrier sheet is preferably an open-celled foam.

In some cases a reinforcing material in the form of a net-like structure may be incorporated between the two sheets of material. The reinforcing material may comprise a net formed from synthetic plastics material and of a mesh size sufficiently large to permit the sheet materials to contact one another between the meshes of the net to retain the integrity of the bond therebetween.

According to a further aspect of the invention there is provided apparatus for the production of a laminated product incorporating discrete particulate material the apparatus including means for continuously feeding a carrier sheet of flexible material a vibratory conveyor device disposed above said carrier sheet and having a discharge opening extending across the width of the carrier sheet for distributing particulate material over the surface of the carrier sheet, means for continuously feeding a sheet of flexible foamed plastics material and for bringing same into juxtaposition with the surface of said carrier sheet, and means for continuously adhering the sheets to one another by fusion.

Preferably said means for adhering the sheets to one another comprises a burner tube extending transversely of the direction of movement of the sheets and serving to direct a flame on to the surface of at least one of said sheets to render said surface tacky, and means for pressing the sheets together after application of said flame thereto.

The invention also provides a laminated product comprising a pair of sheets of flexible material at least one of which comprises a foamed plastics material, the sheets having discrete particulate material entrapped between them and having been adhered together by fusion.

Preferably both said sheets comprise open-celled foamed plastics material and are fused together by flame lamination. The foamed plastics material is preferably polyurethane foam.

Examples of discrete particulate materials which may be incorporated into laminated products according to the invention include fabric softeners, insecticides, pesticides, fungicides, fertilizers, drying agents such as silica gel, charcoal, carbon adsorption media and air freshing compositions. The materials may be in powdered, granular, flaked, crystalline or other discrete particulate form.

An embodiment and examples of the invention will now be described, by way of example only, with reference to the accompanying drawing, which is a diagrammatic cross-section through one form of apparatus for producing a laminated product according to the invention.

Referring to the drawing, a base or carrier sheet 5 comprising polyurethane foam is drawn from a reel 6 beneath a vibratory conveyor device 7 which extends across the sheet 5 and deposits particulate material 8 on the upper surface of the sheet in a uniformly dispersed manner. A further sheet 11 of polyurethane foam is drawn from a supply roll 12 through nip rollers 13A, 13B and heated by a flame applied to the surface of the sheet from a burner 14 which extends across the full width of the sheet, the sheet 11 then being pressed into contact with the carrier sheet 5 between nip rollers 13B and 13C. The burner 14 is tilted upwards at an angle of about 30° to the horizontal in order to prevent scorching of the particulate material supported on the carrier sheet 5. As a result of application of the flame to the sheet 11 the surface of the foam is melted so that it becomes tacky and adheres to the adjacent surface of the carrier sheet 5 when the sheets are brought into contact. The laminated product consisting of the carrier sheet 5, particulate material 8 and upper sheet 11 passes between secondary nip rollers 14A, 14B and is wound on to a take-up roll 15.

While the preferred material for the sheets 5 and 11 is polyurethane foam, other foamed plastics material could be used and in some cases the carrier sheet 5 may comprise a material other than a foamed plastics material, for example a non-woven fibrous material. The thickness of the polyurethane foam sheets may vary considerably depending on requirements but in general will be as thin as possible consistent with sufficient strength to resist tearing or disintegration during storage or transport. Foam thicknesses between 0.5 and 15 mm may be used but thicknesses of 1.0—2.5 mm are preferred. For most applications thin foam will be used to reduce the quantity of

material utilised and hence the cost, but in some cases thicker foams may be preferable. It is not essential that both sheets should be the same thickness and in many cases sheets of different thickness may be used.

The quantity of particulate material applied to the carrier sheet may be varied as required dependent on the nature of the material and other factors.

The speed of travel of the sheets during lamination and the temperature of the flame applied may be varied considerably dependent upon requirements. In general using polyurethane foams having thicknesses of the order referred to above, a speed of travel of the order of 50 yards per minute would be utilised. If the speed of travel is too low the rise in temperature of the foam arising from impingement of the flame is such that the particulate material is scorched during lamination. The speed of travel may of course be varied considerably if the flame temperature is adjusted accordingly and speeds of 30 yards per minute or less could be used depending on flame temperature and other factors. In general it is envisaged that flame temperatures of the order of 1100—1250°C will be used.

The cell size of the foam may be varied considerably dependent on the size of the particulate material concerned and the intended use of the laminated product. In general the cell size must be such that the particulate material will not fall through the foam but subject to this requirement the cells are generally as large as possible to permit permeation and release of the materials through the foam. Cell sizes of between 20 cells/in. and 60 cells/in. may be used, 25—35 cell/in. being more suited to coarse materials and 30—60 cells/in. for finer materials. The density of the foam may vary but is preferably of the order of 15—35 kg/m³.

While a reinforcing net-like material is incorporated it is preferably of relatively large mesh and formed from synthetic yarns fused, knitted or otherwise formed into a net-like structure. The net serves the function of reinforcing the laminated product and in addition enables it to be secured in position when in use. The provision of the net-like structure is not essential but if it is not provided the strength of the laminated product is reduced. The net-like material could be formed from any suitable fibrous or strand-like material and particularly from natural or synthetic yarns. The mesh size of the net-like reinforcement material may vary considerably dependent on the nature and thickness of the sheets, the size and distribution of the particulate material and other factors. In general however the net must be of sufficiently large mesh size to enable the sheets to contact one another and bond securely together at the mesh openings. Where the bottom sheet material is a non-woven fabric the reinforcing net may generally be omitted as the fabric itself will have sufficient strength. The reinforcing net may be applied to the carrier sheet either before or after the particulate material is applied and is held in position between the upper and lower sheets after these have been bonded together.

The following examples are illustrative of various embodiments of the invention:

EXAMPLE 1

Laminate containing powdered activated carbon

In this example the solid material used was an activated carbon with a sieve analysis of 100% passing BS mesh 100 (0.15 mm), and 90% passing BS mesh 200 (0.075 mm). Such a product is Anthrasorb CC200 manufactured by Thomas Ness Limited. The urethane foam used was a flexible polyester material having a density of 26 kg/m³ and a cell count of 22 per linear cm.

The carbon powder was dispensed from a vibratory conveyor on to the surface of a moving web of the foam having a thickness of 3.0 mm. The partially coated surface was then contacted with the melted surface of a similar foam in the nip rollers of a flame laminating machine. The speed of the laminating machine was set at 34 metres/min and the amplitude of the vibratory conveyor controlled to produce a carbon density in the laminate of 36 g/m². The spacing between the nip rollers was set at 1.25 mm, and despite the presence of finely divided powder at the foam/foam interface it was possible to attain a level of adhesion of 145 g/cm.

Such a laminate has uses in areas which utilize the absorptive power of the carbon particles, for example the removal of residual colour or odour from liquids, for gas adsorption in protective clothing, for air conditioning filter cooker hoods and similar applications.

EXAMPLE 2

Laminate containing granular carbon

In this case carbon in the form of granules was utilized rather than powder, the granules having a particle diameter of 0.85—2.0 mm. Such a material is Anthrasorb CC818 manufactured by Thomas Ness Limited. This material was dispensed from a vibratory conveyor on to the surface of a 1.5 mm thick flexible polyester urethane foam having the same physical properties as those in Example 1. The coated foam was subsequently contacted with the flamed surface of a similar foam, also 1.5 mm thick, in the nip rollers of a flame laminating machine set 1.25 mm apart. By this technique the particle size of the carbon granules was reduced by crushing between the rollers. The speed of lamination was 34 metres/min and the amplitude of movement of the vibratory conveyor was adjusted to give a final carbon density of 35 g/m² in the laminate. The level of adhesion obtained via this process was 129 g/cm.

Such a laminate can be used in a range of applications which utilize the adsorption properties of carbon.

EXAMPLE 3

Laminate containing weldable powder

The process was the same as in Example 1 but the carbon powder was replaced by a vinyl chloride vinyl acetate emulsion copolymer in the form of a powder having 99.8% of particles passing BS 52 mesh sieve (0.3 mm). Such a material is Corvic Q44-62 manufactured by Imperial Chemical Industries Limited.

The powder was dispensed from a vibratory conveyor and the foam flame laminated to form a sandwich between 2 webs of flexible polyester urethane foam each 6 mm thick. The lamination speed was 36 metres/min and the gap between the nip rollers was 1.5 mm. By appropriate adjustment of the vibratory conveyor the resultant powder density in the laminate was 50 g/m². The foam-foam adhesive strength produced in this way was 108 g/cm.

The resultant structure was subsequently combined with textile face and lining fabrics by flame lamination and it was found that the product of this example was more easily welded by high frequency techniques than conventional fabric/polyester urethane/fabric laminates.

EXAMPLE 4

In this case the solid was a combined cationic fabric softener/anti-static agent in flake form, known as Sebosan WK100. This material, manufactured by Chemische Fabrick Stockhausen is described as a fatty acid amine condensate. A series of laminates were produced by the same process as the previous examples yielding solid concentrates of 9—38 g/m². The foam carrier was a 4 mm thick polyester urethane foam having density of 35 kg/m³ and 33 cells/linear cm and the flamed foam consisted of 1.5 mm polyester urethane foam of density 26 kg/m³ having 22 cells/linear cm. Lamination speed was 30 metres/min, and the nip spacing was 3.3 mm.

Laminates of this form can be used to condition fabrics by incorporating them during a washing, dry cleaning or high temperature tumble drying operation.

EXAMPLE 5

Example 4 was repeated except that the fabric conditioning material was a flaked non-ionic product known as Sebosan NA100. It is described by its manufacturers, Chemische Fabrick Stockhausen, as an alkylolamine ester. Laminates were produced which contained 21—42 g/m² of flake. Running speed was 30 metres/min and nip spacing 3.3 mm. Such laminates can be used to condition fabrics by addition in a washing, dry cleaning or tumble drying operation.

EXAMPLE 6

Silica gel of particle diameter 1—2.5 mm was laminated between two polyester urethane foams. The carrier foam was 3 mm thick and had a density of 35 kg/m³, with 22 cells/linear cm, while the flamed foam was 4 mm thick, and had a density of 26 kg/m³ and 22 cells/linear cm. The running speed was 30 metres/min and the nip spacing 3.3 mm.

Laminates were produced, by control of the distribution rate, containing from 27 to 212 g/m². Such products because they contain silica gel in a permanently distributed manner can be used as a replacement for free flowing silica gel granules or sachets in areas of drying which are already well known.

EXAMPLE 7

In this example the solid was a potassium nitrate based fertilizer in the form of spheres with an approximate diameter of 2 mm. This was laminated at rates of 16—48 g/m² between polyester urethane foams of density 26 kg/m³, thickness 2.5 mm and cell size 22 per linear cm. The lamination speed was 30 metres/min and the nip gap 3.3 mm.

Laminates of this form because they have a fertilizer evenly distributed in a biodegradable medium could be used in horticultural applications requiring sophisticated means of application.

EXAMPLE 8

In this case the solid medium was a water soluble anti-fungal agent for cold water fish consisting of a granular material having an approximate particle diameter of 1 mm. This material was flame laminated at rates of 29—44 g/m² between polyester urethane foams of density 26 kg/m³, thickness 1.5 mm, and cell size of 22 per linear cm. Lamination conditions were a speed of 30 metres/min and a nip gap of 2 mm. The resultant laminates, because they have a precisely controlled rate of addition, could be used for the purposes of accurate addition of anti-fungal agent to, for example, aquaria, ponds or rivers.

The techniques and examples described possess a number of substantial advantages. A primary advantage arises from the fact that the laminated product may be produced continuously at a relatively high speed. Since the particulate material is retained in position between the laminated sheets and the latter are flexible the products may be readily stored in roller or folded form before use and may be transported in a readily manageable state. Moreover the nature of the foam plastic sheets is such that they may be compressed when in roll form using conventional roll compressing equipment to produce compacted low volume rolls for shipping or other transport purposes. It may be necessary in cases where such compaction is required to select the reinforcement net material, if incorporated, to avoid damage to the foam plastic sheets in the compressed form.

It should be appreciated that while various modifications have been described above other modifications may be effected within the scope of the invention and wide variations in the type, thickness, cell size and structure of the foam, and in the speed of travel, pressures and temperatures applied during bonding may be effected.

Whilst endeavouring in the foregoing specification to draw attention to those features of the invention believed to be of particular importance it should be understood that the applicant claims protection in respect of any patentable features or combination of features hereinbefore referred to whether or not particular emphasis has been placed thereon.

CLAIMS

1. A process for the production of a laminated product comprising continuously feeding a flexible carrier sheet, distributing discrete particulate material over the upper surface of the continuously moving sheet, moving a sheet of flexible foamed plastics material in synchronism with said carrier sheet, bringing said sheet of foamed plastics material into juxtaposition with the upper surface of said carrier sheet after application of said particulate material thereto, and continuously adhering the sheets together by fusion.

2. A process for the production of a laminated product comprising continuously feeding a flexible carrier sheet, distributing over the upper surface of the continuously moving sheet discrete particulate material selected from fabric softeners, insecticides, pesticides, fungicides, fertilizers, drying agents, adsorption media, weldable materials and air freshening compositions, moving a sheet of flexible foamed plastics material in synchronism with said carrier sheet, bringing said sheet of foamed plastics material into juxtaposition with the upper surface of said carrier sheet after application of said particulate material thereto, and continuously adhering the sheets together by fusion.

3. A process according to claim 1 or 2 wherein said particulate materials is in powdered, granular, flaked or crystalline form.

4. A process according to any preceding claim wherein said sheets are fused together by flame lamination.

5. A process according to claim 4 wherein the flame is brought into contact with the surface of said foamed plastics sheet before the latter is brought into juxtaposition with said carrier sheet.

6. A process according to any preceding claim wherein said carrier sheet also comprises a foamed plastics material.

7. A process for the production of a fabric softening product comprising continuously feeding a flexible carrier sheet, distributing over the upper surface of the carrier sheet a fabric softening composition in discrete particulate form, moving a sheet of flexible foamed plastics material in synchronism with said carrier sheet, bringing said sheets of foamed plastics material into juxtaposition after application of said fabric softening composition to said carrier sheet, and continuously adhering the sheets together by fusion.

8. A process for the production of an agricultural or horticultural product comprising continuously feeding a flexible carrier sheet, distributing over the upper surface of the continuously moving sheet an insecticide, pesticide, fungicide or fertilizer in discrete particulate form, moving a sheet of flexible foamed plastics material in synchronism with said carrier sheet, bringing said sheets into juxtaposition after application of said particulate material to said carrier sheet, and continuously adhering the sheets together by fusion.

9. A process for the production of an air freshening product comprising continuously feeding a flexible carrier sheet, distributing over the upper surface of the continuously moving sheet an air freshening composition in discrete particulate form, moving a sheet of flexible foamed plastics material in synchronism with said carrier sheet, bringing said sheets into juxtaposition after application of said air freshening composition to said carrier sheet, and continuously adhering the sheets together by fusion.

10. A process for the production of a flexible sheet product having drying or other absorbent properties comprising continuously feeding a flexible carrier sheet, distributing over the upper surface of the continuously moving sheet a drying agent or an absorption agent in discrete particulate form, moving a sheet of flexible foamed plastics material in synchronism with said carrier sheet, bringing said sheets into juxtaposition after application of said drying or absorption agent to said carrier sheet, and continuously adhering the sheets together by fusion.

11. A process for the production of an anti-fungal product for the treatment of fish comprising continuously feeding a flexible carrier sheet, distributing over the upper surface of the continuously moving sheet a fungicide in discrete particulate form, moving a sheet of flexible foamed plastics material in synchronism with said carrier sheet, bringing said sheets into juxtaposition after application of said fungicide to said carrier sheet, and continuously adhering the sheets together by fusion.

12. A process for the production of a fusion weldable laminated product comprising continuously feeding a flexible carrier sheet, distributing over the upper surface of the continuously moving sheet a fusion weldable material in discrete particulate form, moving a sheet of flexible foamed plastics material in synchronism with said carrier sheet, bringing said sheets into juxtaposition after application of said weldable material to said carrier sheet, and continuously adhering the sheets together by fusion.

13. A process according to any of claims 7 to 12 wherein said carrier sheet also comprises a foamed plastics material.

14. A process for the production of a laminated product according to any of claims 1 to 13 wherein the speed of travel of the sheet materials during lamination is 30—50 yards/minute.

15. A process according to any of claims 1 to

14 wherein the flame temperature during lamination is of the order of 1100—1250°C.

16. A process for the production of a laminated product substantially as hereinbefore described.

17. A laminated product produced by the process according to any of claims 1 to 16.

18. A laminated product comprising two sheets of flexible material at least one of which comprises a foamed plastics material, the sheets having discrete particulate material entrapped between them and being fused together.

19. A laminated product comprising two sheets of flexible material at least one of which comprises a foamed plastics material, the sheets being fused together and having entrapped between them a discrete particulate material selected from fabric softeners, insecticides, pesticides, fungicides, fertilizers, drying agents, adsorption media, weldable materials and air freshening compositions.

20. A fabric softening product comprising two sheets of flexible material at least one of which comprises a foamed plastics material, the sheets being fused together and having entrapped between them a fabric softening composition in discrete particulate form.

21. An agricultural or horticultural product comprising two sheets of flexible material at least one of which comprises a foamed plastics material, the sheets being fused together and having entrapped between them an insecticide, pesticide, fungicide or fertilizer in discrete particulate form.

22. A product having drying or absorption properties comprising two sheets of flexible material at least one of which comprises a foamed plastics material, the sheets having been adhered together by fusion and having entrapped between them a drying agent or an absorption agent in discrete particulate form.

23. An air freshening product comprising two sheets of flexible material at least one of which comprises a foamed plastics material, the sheets having been adhered together by fusion and having entrapped between then an air freshening composition in discrete particulate form.

24. An anti-fungal product for fish comprising two sheets of flexible material at least one of which comprises a foamed plastics material, the sheets being fused together and having an anti-fungal agent entrapped between them.

25. A fusion weldable laminated sheet material comprising two sheets of flexible material at least one of which comprises a foamed plastics material, the sheets being fused together and having entrapped between them a fusion weldable composition in discrete particulate form.

26. A product according to any of claims 17 to 25 wherein both said sheets comprise foamed plastics material.

27. A product according to any of claims 17 to 26 wherein said sheets are fused together by flame lamination.

28. A product according to any of claims 17 to 27 wherein the or each of said foamed plastics sheets comprises an open celled foamed plastics material.

29. A product according to any of claims 17 to 28 wherein the or each of said foamed plastics sheets comprises polyurethane foam.

30. A product according to any of claims 17 to 29 wherein said discrete particulate material is in powdered, granular, flaked or crystalline form.

31. A product according to any of claims 17 to 30 wherein said sheets have a thickness of 0.5—15 m/m.

32. A product according to any of claims 17 to 30 wherein said sheets have a thickness of 1.0—2.5 m/m.

33. A product according to any of claims 17 to 32 wherein said sheets are of different thickness.

34. A product according to any of claims 17 to 33 wherein the or each foamed plastics sheet has a cell size between 20 cells/in. and 60 cells/in.

35. A product according to any of claims 17 to 33 wherein the or each foamed plastics sheet has a cell size between 25 cells/in and 35 cells/in.

36. A product according to any of claims 17 to 33 wherein the or each foamed plastics sheet has a cell size from 30—60 cells/in.

37. A product according to any of claims 17 to 36 wherein the density of said foamed plastics material is 15—35 kg/m^3.

38. A product according to any of claims 17 to 37 incorporating a reinforcing net-like material between said laminated sheets.

39. A product according to claim 38 wherein said reinforcing net material has a mesh size sufficiently large to permit said sheets to contact one another between the meshes of the net.

40. A product according to claim 38 or 39 wherein said net-like material is made from a synthetic plastics material.

41. A laminated product having absorbent properties according to claim 21 wherein said absorbent medium comprises activated carbon in powdered or granular form.

42. A laminated product according to claim 41 wherein said activated carbon is incorporated in an amount of the order of 35—36 gm/m^2.

43. A weldable laminated product according to claim 25 wherein said weldable powder comprises a vinyl chloride/vinyl acetate co-polymer emulsion.

44. A weldable laminated product according to claim 43 wherein said weldable powder is incorporated in an amount of the order of 50 gm/m^2.

45. A weldable laminated fabric comprising a product according to claim 43 or 44 having textile face and lining fabrics adhered to the respective opposite faces thereof by flame lamination.

46. A fabric softening product according to claim 20 wherein said particulate material comprises a cationic fabric softener/anti-static agent in flake form.

47. A fabric softening product according to claim 46 wherein said agent comprises a fatty acid amine condensate.

48. A fabric softening product according to

claim 46 or 47 wherein said agent is incorporated in an amount of the order of 9—38 gm/m².

49. A fabric softening product according to any of claims 46 to 48 wherein said carrier sheet comprises polyester urethane foam having a thickness of the order of 4 m/m and a density of the order of 35 kg/m³ and having approximately 22 cells/linear cm.

50. A fabric softening product according to any of claims 46 to 49 wherein said other sheet comprises a polyester urethane foam of the order of 1.5 m/m thick having a density of the order of 26 kg/m³ and having approximately 22 cells/linear cm.

51. A fabric softening product according to claim 20 wherein said fabric conditioning agent comprises a non-ionic fabric conditioning product in flaked form.

52. A fabric softening product according to claim 51 wherein said fabric conditioning agent comprises an alkylolamine ester.

53. A fabric softening product according to claim 51 or 52 wherein said agent is incorporated in an amount of the order of 21—42 gm/m².

54. A fabric conditioning product according to any of claims 51 to 53 wherein said carrier sheet comprises a polyester urethane foam having a thickness of the order of 4 m/m, a density of the order of 35 kg/m³ and having approximately 22 cells/linear cm.

55. A fabric softening product according to any of claims 51 to 53 wherein said other sheet comprises a polyester urethane foam of the order of 1.5 m/m thick having a density of the order of 26 kg/m³ and having approximately 22 cells/linear cm.

56. A product having drying or absorptive properties according to claim 22 wherein said drying agent comprises silica gel.

57. A product according to claim 55 or 56 wherein said drying agent is incorporated in an amount of the order of 27—212 gm/m².

58. An agricultural or horticultural product according to claim 21 wherein said particulate material comprises a potassium nitrate based fertilizer in the form of spheres of approximately 2 m/m diameter.

59. A product according to claim 58 wherein both said sheets comprise polyester urethane foam having a density of the order of 26 kg/m³, a thickness of the order of 2.5 m/m and having approximately 22 cells/linear cm.

60. A product according to claim 58 or 59 wherein said fertilizer is incorporated in an amount of the order of 16 to 48 g/m².

61. An anti-fungal product according to claim 24 wherein said particulate material comprises a water soluble anti-fungal agent.

62. An anti-fungal product according to claim 61 wherein both said sheets comprise polyester urethane foam having a density of the order of 26 kg/m³, a thickness of the order of 1.5 m/m and having approximately 22 cells/linear cm.

63. An anti-fungal product according to claim 61 or 62 wherein said agent is incorporated in an amount of the order of 29—44 g/m².

64. An agricultural or horticultural product according to claim 21 wherein said particulate material comprises an insecticide and/or fungicide and said product is cut into band-like sections adapted to be wrapped around trunks or branches of trees as an insect or infection protection.

65. A laminated product in accordance with any of the foregoing Examples.

66. Any novel subject matter or combination including novel subject matter herein disclosed, whether or not within the scope of or relating to the same invention as any of the preceding claims.

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